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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,843	01/12/2004	Orlin Velev	5051-668	8437

20792                      7590                      03/09/2007  
MYERS BIGEL SIBLEY & SAJOVEC  
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RALEIGH, NC 27627

EXAMINER
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WATTS, ALLISON LEIGH

ART UNIT	PAPER NUMBER
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1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/755,843	<b>Applicant(s)</b> VELEV, ORLIN	
	<b>Examiner</b> Allison L. Watts	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 12 January 2004.
- 2a)  This action is FINAL.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-37 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a)  All    b)  Some \*    c)  None of:
1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                  |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                      | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                             | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/18/2004</u> | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-10, 12-30, and 32-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Becker et al.

As to claims 1 and 18, Becker et al. disclose a device for the manipulation of a suspended particle in an electric field gradient comprising: a plurality of electrically isolated electrodes on a surface; a liquid composition covering the entire electrode surface; the liquid having an exposed liquid surface for suspending a particle; the electrodes configured to provide an electric field gradient for transporting the particle suspended in the liquid (column 3, line 52 through column 4, line 59; column 11, line 57 through column 12, line 60; Figure 12).

As to claims 2 and 19, Becker et al. disclose the liquid composition consisting of hydrocarbons or oil (column 4, lines 20-37).

As to claims 3 and 20, Becker et al. disclose the particle may be suspended upon or over a surface (column 4, lines 30-33).

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As to claims 4-5 and 21-22, Becker et al. disclose the particle is a solid or a fluid droplet (column 2, lines 53-16).

As to claims 6 and 23, Becker et al. disclose the fluid droplet includes a carried component suspended, dissolved, or solubilized therein (column 2, lines 53-16).

As to claims 7 and 24, the fluid droplet comprises water and the carried component is cells (column 2, lines 53-16).

As to claims 8 and 25, Becker et al. disclose the fluid droplet may be any liquid (column 2, lines 57-64) and the carried component is a microparticle (column 2, lines 53-16). Although Becker et al. does not specifically disclose the fluid droplet comprising hydrocarbons or an organic compound, it does disclose using hydrocarbon or organic liquids for the suspension liquid, as well as using aqueous solutions, which would therefore require the use of droplet composed of hydrocarbons or an organic compound in order to maintain the difference in hydrophobicity between the droplet and the liquid (column 4, lines 20-37).

As to claims 9 and 26, Becker et al. disclose the fluid droplet having a diameter of between about 100 nm and 1 cm, which is equal to a volume of 0.523 micro-liters.

As to claims 10 and 27, Becker et al. disclose the electrodes configured to provide a first pathway for a first particle and a second pathway for a second particle, the pathways having an intersection for combining the particles (column 5, lines 52-65; column 22, lines 5-60; Figures 11 and 12).

As to claims 12 and 32, Becker et al. disclose the electrodes configured in a two-dimensional matrix (column 3, lines 52-59).

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As to claims 13 and 33, Becker et al. disclose the reaction surface having electrodes on a first side and circuits connected to the electrodes on a second side, the electrical circuits connected to an alternating or direct current source (column 18, lines 26-43; column 8, lines 31-52).

As to claims 14 and 34, Becker et al. disclose the electrodes having a length of between 1 micron and 200 microns, and a distance between adjacent electrodes of between 1 micron and 200 microns, which is equal to between 0.001 mm and 0.2 mm (column 5, lines 1-3).

As to claims 15 and 35, Becker et al. disclose a power source providing an alternating current voltage of between about 10 V and 100 V, and at a frequency between about 100 Hz and 20 MHz to the electrodes (column 26, lines 25-36).

As to claims 16 and 36, Becker et al. disclose a power source providing a direct current voltage of between about 1 V and 1000 V to the electrodes (column 15, line 63 through column 17, line 14).

As to claims 17 and 37, Becker et al. disclose the electrodes configured to provide an electric field gradient for applying force to a droplet suspended in the liquid flow in opposing directions for separating the droplet into two droplets (column 5, lines 52-65; column 22, lines 5-60; Figures 11 and 12).

As to claim 28, Becker et al. disclose the droplets comprising constituents of an assay (column 2, line 53 through column 3, line 16).

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As to claim 29, Becker et al. disclose chemically reacting constituents of the first droplet with constituents of the second droplet (column 5, lines 52-65; column 22, lines 5-60; Figures 11 and 1).

As to claim 30, Becker et al. disclose combining the droplets in order to form a solid and/or encapsulated particulate product (column 2, line 53 through column 3, line 16).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 11 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker et al. in view of Benecke et al.

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Becker et al. disclose using electrodes of varying shapes, including circular electrodes (column 9, lines 46-57; column 25, lines 11-13).

Becker et al. does not specifically disclose ring shaped electrodes.

Benecke et al. disclose using ring shaped electrodes (Figure 9; column 4, lines 12-28).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrodes of Becker et al. by using the electrodes of Benecke et al. because the purpose of transporting suspended particles over an electrode surface may be achieved using various electrode shapes, including circular and ring shaped electrodes.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 6056861 A, US 6749736 B1, US 7147763 B2, US 6911132 B2, US 20030170698 A1.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allison L. Watts whose telephone number is (571) 272-6640. The examiner can normally be reached on Monday through Friday, 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALW  
3/2/2007



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